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An Annotated List of the Mantids (Orthoptera, Mantoidea) of Trinidad, B.W.I.[1]

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(Plates I-VIII; Text-figures 1 & 2)

[This paper is one of a series emanating from the tropical Field Station of the New York Zoological Society, at Simla, Arima Valley, Trinidad, British West Indies. This station was founded in 1950 by the Zoological Society's Department of Tropical Research, under the direction of Dr. William Beebe. It comprises 200 acres in the middle of the Northern Range, which includes large stretches of undisturbed government forest reserves. The laboratory of the station is intended for research in tropical ecology and in animal behavior. The altitude of the research area is 500 to 1,800 feet, with an annual rainfall of more than 100 inches.

For further ecological details of meteorology and biotic zones see "Introduction to the Ecology of the Arima Valley, Trinidad, B.W.I.," William Beebe. (Zoologica, 1952, Vol. 37, No. 13, pp. 157-184).]

CONTENTS

INTRODUCTION

THIS contribution consists of incidental data gathered during the prosecution of two other, more specialized studies of Trinidad mantids. One, concerning their cytology, will be published by Hughes-Schrader in the near future; the other, by Crane, discusses defensive behavior and follows the present paper, beginning on p. 259.

In spite of the fragmentary character of many of the observations included in this preliminary report, it seemed desirable to record them for the following reasons: first, field observations on the habitat, color in life, seasonal occurrence, and nymphal stages of neotropical mantids are almost non-existent; second, the sole list of Trinidad mantids previously published numbered only eight species and appeared 46 years ago (Bruner, 1906); third, a number of species in the present collections are rare, and others almost certainly new; therefore it seems helpful to place them on record here, apart from their appearance in the specialized publications, even though the current state of the systematics of neotropical Mantoidea is such that their description must await the group's revision by a specialist.

Two collections are concerned in the present paper. One, made by Hughes-Schrader, was assembled entirely during January, 1952, from various parts of Trinidad. She is responsible for the notes following her initials (S. H.-S.) under *Local Occurrence* and *Disposition of Preserved Specimens*, respectively.

S. Hughes-Schrader concentrated on the col-

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lection of males because of their superiority for establishing cytological characters; hence the preponderance of males in her collection does not necessarily imply unbalanced sex ratios or different habitats for the two sexes. Her collection is not yet ready for distribution, since the cytological work is unfinished; however, the bulk of it will be deposited in the Academy of Natural Sciences, Philadelphia.

The second collection, made by Beebe, Crane and associates (hereafter referred to as W.B.-J.C.) was collected almost entirely in the Arima Valley near the New York Zoological Society's field station at Simla; the few specially designated exceptions were obtained by them from the lowlands. This Arima Valley collection, along with the associated observations, was made during the three seasons of occupancy of the laboratory, between February and June, inclusive, 1950, 1951 and 1952. During 1952 special emphasis was placed on the collecting of mantids, not only by the regular staff but with the help of local small boys and workmen, suitably rewarded. Through this means, and with the recording of every specimen seen in the field or brought to the laboratory, we have some idea of the relative local abundance of the species (Table 1). Since the primary object of the W.B.-J.C. collection was the furnishing of adequate material for work in behavior, relatively few specimens were preserved.

The W.B.-J.C. collections have been distributed among the U. S. National Museum, Washington, D. C., the Academy of Natural Sciences, Philadelphia, Pa., and the Department of Tropical Research, New York Zoological Society, N. Y. 60. The Imperial College of Tropical Agriculture (hereafter referred to as I.C.T.A.) also maintains a reference collection at St. Augustine, Trinidad, which has been labelled in accordance with the present determinations. All oöthecae, nymphs and skins are deposited in the collection of the Department of Tropical Research; although requisite time could not be devoted to their study, they could form an excellent basis for a study of comparative morphology by future workers. Drawings of several first instars are, however, included for comparison with the adults.

Photographs of dried specimens, which may be helpful in the identification of specimens in the field, are included in the present paper; reference should also be made to photographs of the living specimens in the succeeding paper on defensive mechanisms.

Our hearty thanks go to Dr. A. B. Gurney of the U. S. National Museum for his prompt determination of examples of the W.B.-J.C. collection in 1951. They greatly facilitated our field work in 1952. Deep appreciation goes to Dr. J. A. G. Rehn of the Academy of Natural Sciences of Philadelphia for the determination of the joint, completed collections of both S. H.-S. and W.B.-J.C. He also checked our few taxonomic remarks, all of which were made in accordance with his suggestions.

The only change of purely systematic interest in the present paper is the synonymizing of *Bantiella fusca* Giglio-Tos, 1915, and *B. trinitatis* Giglio-Tos, 1915, both apparently known only from the Trinidad type series, with *Promiopteryx granadensis* (Saussure, 1870).

Bruner's (1906) list of Trinidad species consisted of the following: *Liturgousa cayennensis* Saussure, *Mionyx surinamus* Saussure, *Acontista multicolor* Saussure, *Tithrone roseipennis* Saussure, *Acanthops* sp., *Parastagmatoptera vitrepennis* (type description), *Stagmatoptera praecaria* Linnaeus, *Oxyops rubicunda* Stol. All are almost certainly identical with the species of the corresponding genera in the present collection. The remaining species in our collections have apparently not previously been recorded from Trinidad; these are *Mantoida* sp., *Catamusonia* sp., *Thesprotia filum, Angela quinquemaculata, Angela* sp. and *Vates lobata.*

Because of the unsatisfactory condition of systematics in the group, it does not seem advisable to indicate ranges or synonymies. However, it may be said here that the majority of species, as usual with Trinidad fauna, are primarily northern South American forms, the ranges of some of which continue into Panama and Central America. One, *Stagmomantis carolina,* occurs even on up into the United States. *Parastagmatoptera vitrepennis* appears at present to be a bona fide indigenous species, with close relatives in South America. The status of the several forms for which no specific determination can be given must await their further study. In the various parts of *Genera Insectorum* and in *Das Tierreich*: *Mantidae* will be found references to all the species listed (See References: Beier, 1934, 1937.1, 1937.2; Giglio-Tos, 1927; Rehn, 1911).

It is interesting that of the 16 species recorded in both the S. H.-S. and the W.B.-J.C. collections, all except one (*Angela* sp.) occur in the Arima Valley, and all except one of these 15 were taken at least once within 100 feet of the Simla laboratory. It is another proof of the rewards of concentrating collecting and research in one small, rich area.

During the January-June periods in which the collections were made, no special breeding

period was noticed, both adults and young of all except the rare species having been taken throughout the period. Living specimens were bred and reared at Simla in the usual assortment of jars and glass terraria, and were fed, according to size, on moths from the night light, grasshoppers and *Drosophila*. Moisture, which proved exceptionally important in this rain forest climate, was furnished through soaked cotton dental wads, kept in each jar, and through extra sprinkling on dry afternoons. It may be added that the provision of adequate space proved necessary in the rearing of normally lively adults. Nymphs which were allowed to grow in small jars to the adult stage seemed more subject to molting troubles and frequently could not be induced to display. Two useful recent papers concerned with methods of mantid rearing are Roeder, 1936, and Hathaway, 1946. Collecting and feeding methods, which have already been described for salticid spiders (Crane, 1948), were found to be very satisfactory for small and young mantids.

In the text, color names beginning with capital letters are from Ridgway's Color Standards.

Our thanks go to Miss Rosemary Kenedy for photographing the dried specimens and to Mr. John Cody for the text-figures.

TABLE 1. MANTIDS OF THE ARIMA VALLEY, TRINIDAD

Numbers of individuals collected, 1952, Feb.-June, incl.

(Specimens reared from eggs not included)

Promiopteryx granadensis	77	
Liturgousa sp.	30*	
Thesprotia filum	27	
Stagmatoptera septentrionalis	25	(all adult ♂♂)
Tithrone roseipennis	19	
Stagmomantis carolina	10	
Acanthops falcata	6	
Mantoida sp.	4	(all adult ♂♂)
Musonia surinama	4	
Acontiothespis multicolor	3	
Catamusonia sp.	1	(yg. ♀)
Angela quinquemaculata	1	(adult ♂)
Parastagmatoptera vitrepennis	1	(adult ♂)
Oxyopsis rubicunda	0	
Vates lobata	0	

MANTOIDA sp.

Plate I, Figure 1

Local Occurrence.—W.B.-J.C.: Very rare. Only 4 specimens taken in the Arima Valley, all ♂♂ and all in 1952, between May 24 and June 16. Three came to the night light; the fourth was taken in daylight, running along a packing case beside an outbuilding. A ♀, apparently taken the previous August in the lowlands, was given to us.

Color in Life.—General color brown, marked very finely with light gray. Details of a single ♂: Head, prothorax and eyes dark brown above, mottled and streaked with off-white. Facial shield paler, lightly spotted with brown. Antennae dark brown, basal segment and underside of first free segment white. First coxae greenish-white, others pale gray; trochanters, femora and tibiae af all legs marbled gray and brown, there being more brown above than below; tarsi banded light and dark brown. Tegmina translucent, the veins dark brown, the cross-bars gray; a small brown stigma. Wings translucent, the veins and cross-bars all dark brown and the coastal margins darker than the rest. Sternum and venter gray, blotched with dark brown. Dorsum of abdomen dark brown except for distal border of each segment which is gray. Copulatory organ dark brown above, pale below with longitudinal dark brown streaks.

Body Length.— Dried ♂ 17 mm; dried ♀ 15.

Remarks.—Rehn considers this species to be probably new, close to or identical with one as yet undescribed from Colombia.

Disposition of Preserved Specimens.—(All W.B.-J.C.): Acad. Nat. Sci. Phila., 1 ♂, 1 ♀; reserved by Dept. Tropical Res., N.Y.Z.S., 1 ♂.

LITURGOUSA sp.

Plate I, Figure 2

Local Occurrence.—W.B.-J.C.: In Arima Valley, sporadically common on tree-trunks, especially cacao, citrus and tonka. Except in the height of the dry season, could usually be found when hunted. Two or 3 specimens were occasionally taken on the same trunk, not always adults or of different sexes. Not attracted to night lights. Thirty specimens, adult and immature, recorded during 1952.

S. H.-S.: Widely distributed throughout the island and sporadically abundant, this *Liturgousa* was taken repeatedly from trunks of various citrus fruit trees and cacao. In a grove of lime trees in St. Augustine, Jan. 19, 3 adult and 1 juvenile ♀♀ and 3 adult and 2 juvenile ♂♂ were collected, and these constituted but a small part of the resident population. Small specimen trees of a *Cassia* in a garden close to this lime grove carried a small population of this species; 1 adult and 1 pre-adult ♂ and 1 adult ♀ were collected here on Jan. 15 and at least as many more were observed there during the following few weeks. From the trunks of cacao trees stem the following records: 1 pre-adult ♀, in barranca just north of

* More could have been recorded; *Liturgousa* can usually be found in normal habitat when hunted.

Mt. St. Benedict, Jan. 8; 1 pre-adult ♂, from a grove near Maracas Falls on Jan. 10; and 1 adult ♂ from the River Estate, Diego Martin Valley, on Jan. 18. In the far southwestern part of the island, near Debé on the slopes bounding the Oropuche Lagoon, a stand of old and neglected orange trees carried a large population; 1 adult ♀ and 5 adult ♂♂ were collected here on Jan. 17.

Breeding.—Two second instar young were taken on house wall, March 10. Immature specimens recorded Feb.-June.

Color in Life.—No sexual dimorphism. Variable, but always closely resembling lichenous bark. Entire exposed dorsal surface, including tegmina and excluding legs, mottled with pale and dark. Pale tints range from buff through buffy green to greenish-gray; dark tones are usually brown or slate. Even the eyes are similarly mottled during daylight. Dorsal and posterior parts of legs and cirri (that is, parts visible from above) banded with light and dark in same hues as dorsal portions of body. Ventral and anterior parts of legs, and of concealed and second and third coxae, pale blue-green. Remaining underparts greenish-white. Wings slate color, sometimes with dark brownish tinge. Dorsum of abdomen brown, washed heavily with slate, especially medially, or completely slate. In ♀♀, however, where tip of dorsum projects beyond tegmina, the dorsum is mottled homogeneously with the tegminal coloration.

Nymphs similar in color to adults, except that the early instars are somewhat paler, with the legs banded all the way around with contrasting light and dark.

Body Length.—Dried ♂♂ 20-22 mm; dried ♀♀ 26.5-28; anaesthetized young, first instar 4.3.

Remarks.—In Rehn's opinion, this species is apparently new. Although close to *L. maya* S. & Z., cytological evidence obtained by S. H.-S. shows it to be a form distinct from *maya* and all other *Liturgousa* thus far studied cytologically.

Disposition of Preserved Specimens.—S. H.-S.: 22 specimens preserved; not yet ready for distribution. W.B.-J.C. specimens: 14 adults preserved; distributed as follows: Acad. Nat. Sci. Phila., 4 ♂♂, 4 ♀♀; U. S. Nat. Mus., 2 ♂♂, 2 ♀♀; reserved by Dept. Tropical Res., N.Y.Z.S. 1 ♂, 1 ♀, all young.

PROMIOPTERYX GRANADENSIS (Saussure, 1870)

Plate II, Figures 6, 7; Plate VIII, Figure 28

Miopteryx granadensis (Saussure, 1870) p. 237; *Promiopteryx granadensis,* Giglio-Tos, 1927, p. 209; Beier, 1937, p. 8. *Bantiella trinitatis* Giglio-Tos, 1915, p. 187, 1927, p. 258; Beier, 1937, p. 6. *B. fusca* Giglio-Tos, 1915, p. 187, 1927, p. 258; Beier, 1937, p. 6, pl. I, fig. 3.

Local Occurrence.—W.B.-J.C.: This was the most abundant mantid in the Arima Valley between Feb. and June during the three seasons of observation. 77 specimens were recorded during 1952. Common in bushes and on grass, in clearings, in gardens, and along roads and forest edges. ♂♂ occasionally fly to night lights. This species was taken only singly, except for 2 ♂♂ found together on a wire netting (not near night light). Several ♂♂, ♀♀ and young, however, have been kept in the same terrarium for several weeks, without fighting or cannibalism; they were, of course, well fed and uncrowded.

One adult ♀ taken at summit of Mt. Tucuche, 3,000 ft., on grass, by Mr. Edwin McConkey.

S. H.-S.: Extremely abundant throughout the island, both in the lowlands and the valleys of the Northern Range, during the period of my field work Jan. 5-Feb. 12, 1952. Of 6 specimens preserved, 2 adult ♂♂ were taken by sweeping low ground cover, 1 above the reservoir, Mt. St. Benedict, on Jan. 5, and 1 on the trailside, Maracas Falls, Jan. 10. One juv. ♀ was beaten into umbrella from low shrub at foot of Mt. St. Benedict, Jan. 17. One juv. ♂ was taken by umbrella method from low roadside cover near Milestone 4, Arauca Valley Road, on Jan. 16; 1 from low growth at forest edge, River Estate, in the sunken head of the Diego Martin Valley, on Jan. 18; and 1 in a similar locale on Noel Trace, St. Augustine.

Breeding.—Typical oöthecae are oblong, moderately thin packets measuring between 3.2 × 2.4 mm and 4.4 × 2.8 mm. They were produced by captive ♀♀ throughout the season, from February through June.

Color in Life.—Both sexes monochrome, pale to dark brown, with indistinct marblings sometimes visible in the paler specimens; ♂♂ usually darker than ♀♀; tegmina and wings hyaline, dark brown. Expanded first femora in ♂♂ ranging from pale buff through marbled forms to black, in ♀♀ from buff to marbled brown. All except the palest and darkest examples show 3 distinct brownish-black vertical bands, narrow or wide, sometimes almost confluent, on the inner sides, or at least dorsal surface, of first femur. It is only in occasional ♀♀ and young, or rare ♂♂, that the outer sides of first femur have a reddish-brown cast, as described in *Bantiella trinitatis* Giglio-Tos.

General coloration of young similar to adults. First femora uniformly black in first instar. Since broods have not been completely reared, the development pattern in the two sexes is unknown. However, the following facts have been established: the femora of some young become pale after the second or third molt; no middle-instar ♀♀ are known with dark femora, so that apparently dark femora are restricted in ♀♀ to the first and second instars; some immature ♂♂ have light femora, but regain the darkness of the first instar after the final molt, while in other adult ♂♂, as described under adult coloration, the femora remain light. There is some evidence that a humid environment for the early stages produce adults with darker femora, but exact experiments remain to be performed. The effect of environmental color and brightness during growth remains to be investigated, as does the entire genetic aspect. No color changes were observed during the course of a single instar once the full pigmentation following the molt had been attained. (Cf. various experiments performed on color change in mantids, esp. *Mantis religiosa* L., James, 1944).

Body Length.—Dried ♂♂ 14-15 mm, living and alcoholic 16-17; dried ♀♀ 15-16, living and alcoholic 17-20. First instar, alcoholic, 3.4.

Remarks.—Rehn is of the opinion that both *B. trinitatis* and *B. fusca*, known only from the Trinidad type specimens, are synonymous with *Promiopteryx granadensis*, recorded from Central and South America. From our own observations and collections there is no question concerning the synonymy of *B. trinitatis* with *B. fusca*, distinguished by Giglio-Tos on the basis of the coloration of the first femur and a slight difference in wing length. W.B.-J.C. secured a full range of color variation; one of the lightest was taken within a foot of one of the darkest; length of wings in the series did not vary perceptibly in relation to color.

Disposition of Preserved Specimens.—S. H.-S.: 6 specimens preserved; not yet ready for distribution. W.B.-J.C.: 50 specimens preserved, distributed as follows: Acad. Nat. Sci. Phila., 8 ♂♂, 5 ♀♀; U. S. Nat. Mus., 8 ♂♂, 5 ♀♀; reserved by Dept. Tropical Res., N. Y. Z. S., balance of collection including all young.

Musonia surinama (Saussure, 1869)

Plate II, Figures 8, 9; Plate VIII, Figure 30

Local Occurrence.—W. B.-J. C.: Rare. One adult ♂ and 3 pre-adult ♀♀ taken by shaking roadside bushes, 600-800 feet, Arima Valley, all in Feb.-May, 1952. The immature specimens were reared to the adult stage. One ♂ (Mar. 23) and 2 ♀♀ (June) collected by Major R. Senior-White near St. Augustine, 1952.

S. H.-S.: Two adult ♂♂ taken. One of them was observed sitting motionless on inflorescence of Sun Hemp at Dept. Agric. Experimental Farm, St. Augustine, Jan. 19. The second was obtained by sweeping grass and herb borders of experimental vegetable plots, I. C. T. A. campus, St. Augustine, Jan. 30.

Breeding.—One oötheca, 4.5 mm long, deposited April 3 against a small, dried leaf.

Color in Life. — Monochromatically dull straw in both adults and young, including hyaline wings.

Size.—Dried ♂♂ 23-24 mm; dried ♀♀ 26-30.

Disposition of Preserved Specimens.—S. H.-S.: 2 ♂♂, not yet ready for distribution. W. B.-J. C.: 6 specimens preserved, distributed as follows: Acad. Nat. Sci. Phila., 2 ♀♀; U. S. Nat. Mus., 1 ♂, 1 ♀; reserved by Dept. Tropical Res., N. Y. Z. S., 1 ♂, 1 ♀.

Catamusonia sp.

Plate III, Figures 10, 11

Local Occurrence.—W. B.-J. C.: Very rare. One ♀ only taken in Arima Valley, 600 ft., Mar. 9, 1952; pre-pre-adult instar; shaken from bush; reared to adult. 2 adult ♂♂ acquired from lowlands; 1 collected by Major R. Senior-White, Borderial Savanna, Ararijuez, Mar. 6; 1 by Mr. Edwin McConkey, taken at night on a bush on Churchill-Roosevelt Highway south of Arima, June 12.

S. H.-S.: A single adult ♂ was observed by flashlight at night on *Hibiscus*, St. Augustine, Jan. 24.

Color in Life.—♂: General color greenish-yellow, the underparts more green, the upper pale straw, especially prothorax. Forelegs greenish-yellow; other legs light green; tegmina and wings hyaline. ♀: Entirely green with lateral margins of thoracic and abdominal segments faint, dull purplish. Pre-adult instar of same individual green, without purplish margins. Pre-pre-adult instar monochromatous pale brown. The color change was perhaps brought about by the fact that the insect was reared to maturity in a glass jar resting on a green table. (Cf. James, 1944).

Body Length.—Dried ♂ 47 mm; dried ♀ 54; same ♀ alive 61; pre-adult, alive, 43; pre-pre-adult, alive, 31.

Remarks.—According to Rehn, this species is probably new.

Disposition of Specimens.—S. H.-S.: 1 ♂, not yet ready for distribution. W.B.-J.C.: Acad. Nat. Sci. Phila., 1 ♂; reserved by Dept. Tropical Res., N. Y. Z. S., 1 ♂, 1 ♀.

THESPROTIA FILUM (Lichtenstein, 1796)

Plate III, Figures 12, 13; Plate VIII, Figure 29

Local Occurrence.—W. B.-J. C.: ♀♀ and young fairly common in Arima Valley, in bushes and on the trunks and branches of low trees; in roadside scrub, cacao, citrus, gardens, forest clearings and margins. Adult ♂♂ taken only twice, once at night light and once by shaking. A third was reared from the pre-pre-adult stage.

S. H.-S.: The 3 specimens taken were all ♀♀. Of these 1 adult and 1 pre-adult were observed on trunk of large *Anona* tree, 8 feet from ground, in upper part of barranca, just north of Mt. St. Benedict on Jan. 8. The third, a juvenile, was taken by umbrella beating from vine and high grass festoons at forest edge just off Cleaver Road, in a small forest reserve near Arima, Jan. 26.

Breeding.—Oöthecae oblong, moderately flattened, usually holding 5 to 9 eggs. Measurements: Length 5.3 to 6.5 mm; width 3.7; thickness 2.2. All of the half dozen seen were laid between the lid and the top edge of the terrarium, the ♀ thrusting the tip of abdomen into the crevice. It seems probable, therefore, that the oötheca is normally placed under loose bark.

Color in Life.—♀♀ and young: completely brown, in various shades, but each individual monochrome except for an occasional dorsal, median dark streak or a series of dark spots, in proximal part of abdomen; these can appear and disappear in same instar; the range of brown shades extends from light straw through grayish-brown to dark brown. A typical ♀ in Ridgway fell between Vinaceous Buff and Ecru-drab. ♂♂: similar to ♀♀, but dorsal surface of abdomen tinged with dull reddish. Tegmina and wings hyaline, drab. Freshly emerged first instar young cream-colored, changing to grayish-brown, entirely mottled and spotted with dark, including head, antennae and legs.

Body Length.—Dried ♂♂ 43-47 mm; dried ♀♀ 54-56; anesthetized first instar 7.7.

Disposition of Preserved Specimens. — S. H.-S.: 3 ♀♀, not yet ready for distribution. W. B.-J. C.: 7 specimens preserved, distributed as follows: Acad. Nat. Sci. Phila., 2 ♂♂, 1 ♀; U. S. Nat. Mus., 1 ♂, 1 ♀; reserved by Dept. Tropical Res., N. Y. Z. S., 1 ♂, 1 ♀, all young.

ANGELA QUINQUEMACULATA (Olivier, 1792)

Plate IV, Figure 16

Local Occurrence.—W. B.-J. C.: Only 2 ♂♂ known from Trinidad, both from Arima Valley; 1 taken by shaking low bushes, 600 ft., April 14, 1950; 1 caught April 11, 1952, when seen to fly at edge of Simla orchard, alighting on a small, shrubby tree with green leaves at height of 5 ft.

Color in Life.—Monochrome brown except for tegmina and wings; tegmina completely hyaline; wings hyaline shading distally into brownish-fuscous with a row of 5 spots near anterior margin; these consist of a yellowish-orange central spot flanked on each side by 2 brown spots, the outermost and innermost being very faint and well separated from their neighbors.

Body Length.—1 dried ♂ 83 mm.

Disposition of Specimens.—The 1952 ♂ was unfortunately eaten by an escaped mouse opossum, from an insect-proof, hanging spreading board. The other specimen is in the collection of the Department of Tropical Research, N. Y. Z. S.

ANGELA sp.

Plate IV, Figure 17

Local Occurrence.—♀♀ only; unknown from the Arima Valley. W. B.-J. C.: 1 ♀ brought dead to laboratory, Feb., 1952, taken near St. Augustine.

S. H.-S.: 4 ♀♀ captured, all by umbrella method, on the following dates and localities: Jan. 17, low forest, foot of Mt. St. Benedict; Jan 21, edge of forest, River Estate, Diego Martin Valley; Jan. 27, roadside shrubs bordering forest near the Saddle, Maracas Bay Road; Feb. 7, trailside brush in low forest near Sangre Grande.

Color, Dried Specimen.—Head, thorax, abdomen, legs and tegmina dark brown. Wings brown, the anterior margin semi-opaque; behind this are 2 dull ochraceous orange spots alternating with 2 dark brown spots, one of the latter being outermost; remainder of wings translucent, finely reticulated with yellowish and dark brown.

Body Length.—1 dried ♀ 100 mm.

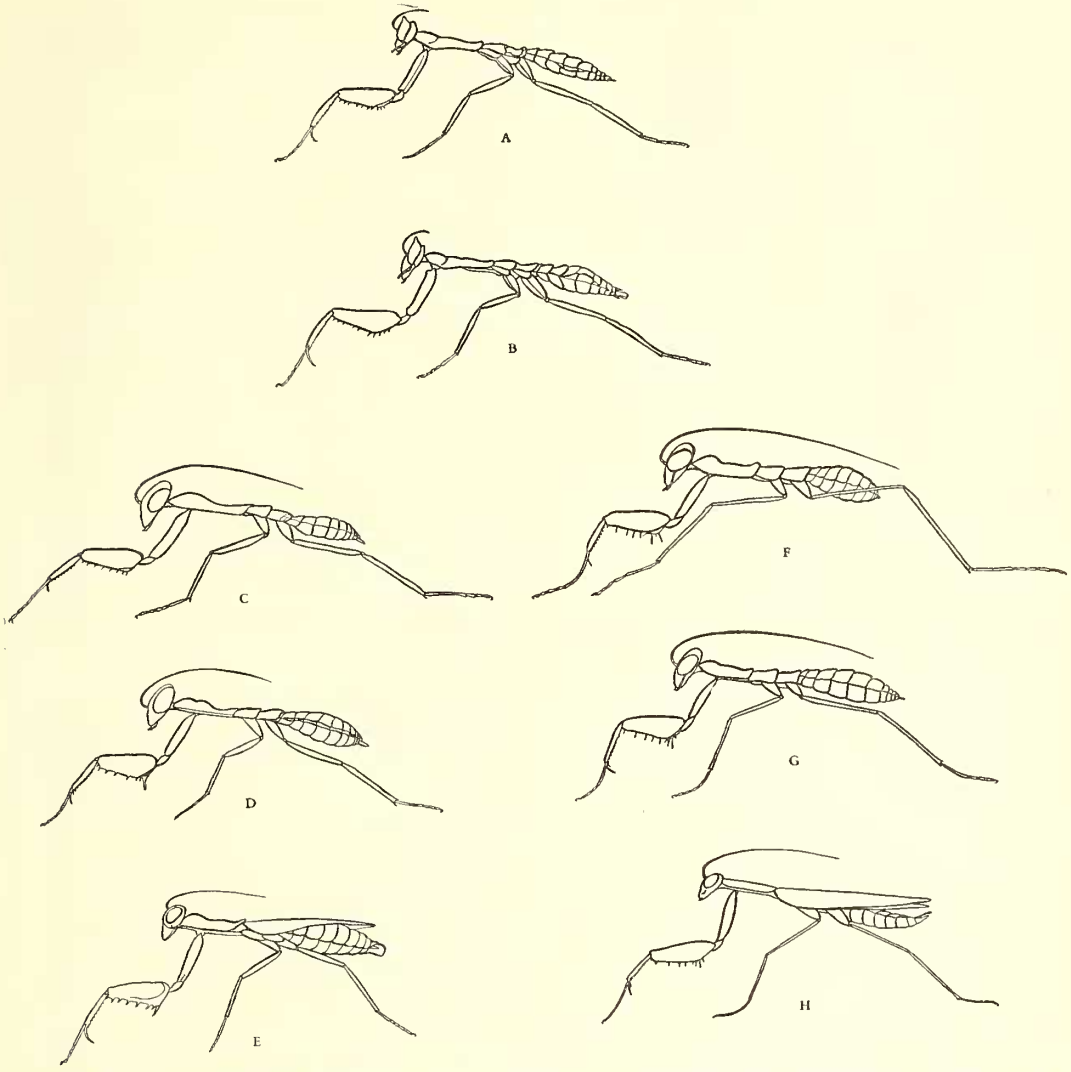
Remarks.—According to Rehn, this may possibly be the ♀ of *A. quinquemaculata,* but will more probably prove to be another species.

Disposition of Specimens—S. H.-S.: 4 ♀♀, not yet ready for distribution. W. B.-J. C.: 1 ♀ in the collection of the Dept. Tropical Res., N. Y. Z. S.

ACONTIOTHESPIS MULTICOLOR (Saussure, 1870)

Text-figures 1 C, D, E, 2 A, B; Plate I, Figures 4, 5; Plate VIII, Figure 32, right

Local Occurrence.—Uncommon in the Arima Valley. W. B.-J. C.: Several taken in 1950, 2 in 1951, 3 in 1952; Feb. to May; on low green shrubs; trailsides, roadsides, forest edges; 1 ♂ on ground on dead stick in citrus orchard.

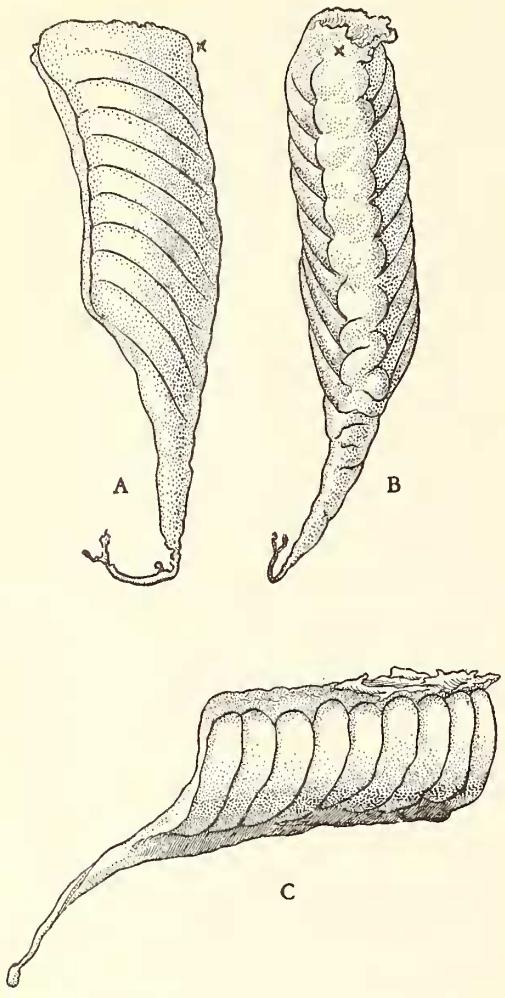


TEXT-FIG. 1. A. *Acanthops falcata,* 1st instar, body length 7.1 mm; B, same, 3rd instar, body length 13.3 mm; C, *Acontiothespis multicolor,* 1st instar, body length 5.3 mm; D, same, 3rd instar, body length 8.3 mm; E, same, adult ♀, body length 19 mm; F, *Tithrone roseipennis,* 1st instar, body length 5.5 mm; G, same, 3rd instar, body length 9.3 mm; H, same, adult ♂, body length 20 mm.

S. H.-S.: Jan. 10, 1 adult ♀, taken by sweeping grassy clearing, upper section Maracas Falls Road. Jan. 23, 1 juv. ♂, by sweeping grass plot at roadside (opposite junction with Verdant Vale Road), Arima valley; several ♀♀ were observed here but were not collected. Jan. 30, 1 adult ♀, by umbrella beating, from low shrubs along Noel Trace, St. Augustine. 2 adult ♀♀ were also observed but not collected on low growth bordering paths, experimental banana plots, I. C. T. A. campus, St. Augustine. Feb. 1, 1 juv. ♀ from *Celosia,* Botanical Garden, Port-of-Spain.

Breeding.—A captive ♀ deposited 4 oöthecae, the last 3 within a period of 10 days. The largest measures, without filament, 11 × 4 × 3.8 mm; attachment at end opposite filament. 2 ♂♂ and 2 ♀♀, siblings, were reared to maturity, being maintained at laboratory temperatures with abundant food. Including the adult, there are 6 instars in ♂♂, 7 in ♀♀. Time from hatching to final molt, 71 and 73 days in ♂♂, 83 and 87 days in ♀♀.

Color in Life.—Adult, both sexes: Maximum coloration: Head, thorax and tegmina light green mottled with cream; wings scarlet, bor-



TEXT-FIG. 2. Oöthecae. A, B. *Acontiothespis multicolor;* length without filament 4.0 mm. X indicates corresponding faces. C, *Tithrone roseipennis;* length without filament 11.5 mm. See also Plate VIII.

dered with black; dorsum of abdomen buff except basally where it is sometimes reddish. The reared ♂ and ♀ were both paler than the above, in both reds and greens. One wild ♂, taken on a dead stick, showed no cream, the head and thorax being dull green, the tegmina translucent blotched with brown, except for the green border; wings rusty basally, translucent distally with a broad, broken band of dark brown; dorsum rust brown with central splotches of dark brown.

First Instar: Similar to one of the local small, reddish ants. Head, forelegs, posterior extension of prothorax and entire meso- and metathorax pale brown. Posterior edges of thoracic segments narrowly margined with bluish-white; anterior, swollen part of prothorax dark chestnut. Abdomen chestnut with grayish sheen. Basal joint of antennae white; one-third of remainder white, rest dark. Basal half of femur in second and third legs dark brown, followed by a narrow band of white.

Second Instar: Similar to first, but darker, generally brown, without chestnut red tinges. Head, metathorax and dorsal scutes of abdomen Antique Brown. Anterior, swollen half of prothorax black, thickly covered with short white hairs. Posterior half of prothorax and all mesothorax Pecan Brown, both together with the metathorax posteriorly with white. Ventral side of abdomen pale bluish-white. Basal joint of antennae Pecan Brown; second joint black; remaining joints white except for distal which are gray. Base of first coxae black, followed by a broad band of white; distal half of coxa and all femur Zinc Orange; tibia Antique Brown; tarsus black. Coxa of four walking legs and basal half of femur black; a white band around middle of latter; distal half of femur and all of tibia pale brown; tarsus white.

Third Instar: Coloration exactly as in second.

Fourth Instar: Head Onion-skin Pink; anterior two-thirds of prothorax black, reddish laterally; posterior third of prothorax, and all mesothorax Cream-buff, bordered with white; metathorax dark brown; abdomen black above, faintly mottled with white; reddish-brown posteriorly, laterally and below. Forelegs Onion-skin Pink, except tarsi which are black with narrow white bands; a black spot on posterior tip of femur and at center of tibia; second and third legs dark, banded with pale.

Fifth Instar: Head pale pink; all thoracic segments brown, except that the anterior two-thirds of the prothorax and the metathorax may be black; abdomen brown or black, shading laterally and posteriorly into pale pink and this into the pale brown of the ventral thorax and abdomen; 3 pink longitudinal lines on ventral surface of abdomen. Forelegs flesh color; femur pink with a median black band extending partly around and a large black spot around the large posterior spine; tibia and tarsi black banded. Four posterior legs banded black and pale brown.

Sixth Instar: Head vinaceous; prothorax black above; mesothorax olive green, the tegminal buds vinaceous with three black spots; metathorax black, the wingbuds black with vinaceous venation and broad border; abdomen dorsally black; upper sides vinaceous faintly dotted with paler; sternum olive buff; ventral surface of abdomen buffy. Foreleg buff, deepening to vinaceous near serrations; femur with

large black spot near proximal end; tibia with median black spot. Second and third legs banded black and white. It will be noticed that the first hint of the characteristic spotting of the adult appears in this stage; green, however, except for dull olive on the mesothorax and sternum, does not appear before the adult.

Body Length.—Adult ♂♂, dried, 14-16 mm; adult ♀♀, dried, 19-20. Young, anaesthetized: 1st instar, 5.3; 2nd, 8; 3rd, 8.3; 4th, 10.7; 5th, 14.7; 6th, 19 (♀).

Disposition of Preserved Specimens.—S. H.-S.: 4 specimens preserved, not yet ready for distribution. W.B.-J.C.: 6 adults preserved, distributed as follows: Acad. Nat. Sci. Phila., 1 ♂, 1♀; U. S. Nat. Mus., 2 ♀♀; reserved by Dept. Tropical Res., N. Y. Z. S., 1♂, 1♀, all young.

TITHRONE ROSEIPENNIS (Saussure, 1870)

Text-figures 1 F, G, H; 2 C; Plate I, Figure 3; Plate VIII, Figure 32 middle

Local Occurrence.—W. B.-J. C.: In the Arima valley, from Feb.-April of the exceptionally wet seasons of 1950 and 1951, this mantid was about as abundant as *Promiopteryx*. During the same months of the drier year, 1952, it was much rarer, the captured adults of *Tithrone* numbering only 19 to 64 of *Promiopteryx*. Both sexes of *Tithrone* occasionally came to night lights, especially before the onset of dry weather; later taken by shaking only. Found in waste places, the edges of pasture and scrub; usually close to ground, in bushes or in grass and other monocotyledons. Occasionally taken on garden flowers, resting on stem close to blossom. Occurs at least to 1,800 feet. Small groups of individuals were occasionally taken on a small bush or small patch of grass. Once 8, of both sexes, all adults, were found on the same low branch of a trailside microphyllous tree in second growth.

S. H.-S.: Collection records of this species are as follows: Jan. 6, 1 adult ♀, distended with eggs, taken by sweeping low ground cover near trail to reservoir; Mt. St. Benedict. Jan. 8, 1 adult ♀; distended with eggs; beaten into umbrella; low trailside vegetation; foot of Mt. St. Benedict. Jan. 20, 3 adult ♂♂; 1 of these observed on grass in small clearing on the divide, Arima Valley Road; sweeping this clearing yielded the two other ♂♂, and several adult ♀♀ which were released. Jan. 24, 1 preadult ♂, by sweeping low ground cover, Intake Trace, Arima Valley. Jan. 26, 1 adult ♂, by umbrella beating from shrubs, forest edge, Cleaver Road (near Arima). Jan. 28, 1 juv. ♂, by umbrella beating; low growth, forest edge; upper Guanapo Valley Road. This species was also observed, but not collected, in the Arena Forest Reserve; on Maracas Bay Road at forest edge; on I. C. T. A. campus, St. Augustine; and in clearing in low forest near Sangre Grande; it is clearly widely distributed and sporadically abundant.

Breeding.—Both ♂♂ and ♀♀ mate more than once with either the same or different partners. They may be kept together in groups or pairs in terraria for weeks at a time, without cannibalism, so long as they are abundantly fed and ample space is provided. One ♀ produced 5 oöthecae in 38 days. Oöthecae are oblong, as thick or thicker than high; the range of typical examples is from 7.1 × 3.7 × 4.4 mm to 9.6 × 4.5 × 4.5; attached along longitudinal axis. About 21 days are passed in the egg; there are almost certainly 6 instars, including the adult, in ♂♂, 7 in ♀♀; roughly 2½ to 3 months are required for development from emergence to the final molt, when maintained at laboratory temperatures with ample food.

Color.—General color, both sexes, green except for wings which are red with yellow tips. Details of coloration: ♀: Eyes, head, thorax above and exposed portions of tegmina, Peacock Green to Grass Green; antennae and mandibles black; foreleg spines horn-colored medially, black distally. Legs and underparts of head and thorax lighter green, ranging to Calliste Green. Hindwing Eugenia Red, bordered anteriorly with Cadmium Yellow, distally Apricot Yellow. Right tegmen, its inner two-thirds covered by left, is translucent and reddish. Dorsal surface of abdomen Eugenia Red, with or without a narrow median black stripe. Dorso-lateral margin white, narrowly bordered above with greenish, bounding the red; below the white there may be a narrow band of pinkish. Ventral surface of abdomen yellowish-white to pale greenish-yellow. ♂ differs in lacking yellow margins of wings and white abdominal distal border.

First Instar: Has the appearance of a small black ant. Color jet black, all tarsi pale, posterior edge of all thoracic segments white.

Second Instar: Head, thorax and abdomen entirely red brown, except for white posterior edges of thoracic segments. Coxa and femur of foreleg red brown; joints and remaining segments of all legs translucent green.

Third Instar: Head and anterior prothorax pale amber; posterior half of prothorax and all other upper parts, darker Vinaceous Fawn, the pale margins of the thoracic segments scarcely visible in this instar. Dorsum with a black patch halfway to tip, with some dark mottling just anterior to it.

Fourth Instar: Head, thorax and all legs Neva Green; tarsi pale. Abdomen pale green washed

above with pale brownish-red and with posterior margins of segments strong brownish-red.

Fifth Instar: Head, thorax and all legs Malachite Green; spines dark; tarsi pale. Abdomen Rejane Green, with an indistinct median dusky line, the edges of the segments margined narrowly dorsally, and widely laterally with light purple; on venter the border is darker.

Body Length.—Adult ♂♂, dried, 19.5-20.5 mm., adult ♀♀, dried, 23-25; young anaesthetized: 1st instar, 5.5; 2nd, 7.2; 3rd, 9.3; 4th, 10; 5th, 15.

Disposition of Preserved Specimens—S. H.-S.: 8 specimens preserved, not yet ready for distribution. W.B.-J.C.: 15 adults preserved, distributed as follows: Acad. Nat. Sci. Phila., 3 ♂♂, 3 ♀♀; U.S. Nat. Mus., 3 ♂♂, 3 ♀♀; reserved by Dept. Tropical Res., N. Y. Z. S., 2 ♂♂, 1 ♀, in addition to all young.

Acanthops falcata Stol, 1877

Text-figure 1 A, B; Plate IV, Figures 14, 15; Plate VIII, Figure 31

Local Occurrence.—W. B.-J. C.; Uncommon to rare in the Arima Valley; only six adults taken in three seasons, distributed from February through June, although a number of additional young were caught. On bushes and small trees, both green and deciduous, roadside, gardens and forest margins. One ♂ at night light.

S. H.-S.: 2 adult ♀♀ were seen; 1 was taken near top of divide, Arima Valley, Jan. 20, by umbrella beating of high tangle of dead branches and vines in low trees at forest edge; the second was observed but not collected on Jan. 30, in the lowlands near St. Augustine in a similar thicket containing much dead vegetation. 2 juv. ♂♂ were taken, one on Jan. 19, by umbrella beating along Noel Trace, St. Augustine, and one by same method along forest edge, Heights of Aripo Road, on Jan. 25. A juv. ♀ was taken, also by umbrella beating of vine-covered shrubs, in Arena Forest Reserve, on Jan. 31.

Breeding.—Oöthecae deposited throughout the season, February to June. Elongate, curved, pod-like, typically ranging in length from about 30 to 50 mm and width 3.5 to 5; thickness less than half the width. About 3 weeks passed in the egg. Seven instars, including the adult, in both sexes. A ♂ and ♀, siblings, required 95 to 105 days, respectively, for development from emergence to final molt when maintained at laboratory temperature and provided with abundant food.

Color in Life.—♂: Exposed parts completely dark brown; wings blackish hyaline; abdomen very faintly banded with black and Dark Vinaceous Brown. ♀: variably dark brown, except for a whitish band around posterior part of prothorax; yellow reticulations on wings; variably pinkish to purple-red bands on dorsum, which alternate with narrower black bands at sutures of abdominal segments. Both sexes resemble to perfection two or more dried and shrivelled leaves.

First Instar: Dark brown except as follows: antennae pale, narrowly bordered with black; proximal joints of all legs mottled with pale; tarsi of second and third legs pale.

Second and Third Instars: As in first, except that proximal joints of legs are not mottled.

Fourth Instar: As in first and second, except as follows: first appearance of white thoracic band around posterior part of prothorax; here it is pale cream, relatively broad, with an irregular, very dark, eyelike spot on each side near its anterior border. Lateral flanges on wider segments of abdomen and inner aspects of 1st coxa, femur and tibia lighter red-brown; femur of 2nd and 3rd legs dotted with white.

Fifth Instar: As in fourth.

Sixth Instar: As in fourth, except that posterior part of prothorax is only slightly lighter than general coloration, its black mark in form of shallow crescent.

Body Length.—Adult ♂♂, dried, 31-35 mm; adult ♀♀, dried, 32-34; young, anaesthetized: 1st instar, 7.1; 2nd, 11.7; 3rd, 13.3; 4th, 15.5; 5th, 26; 6th, 30.

Disposition of Preserved Specimens.—S. H.-S.: 4 specimens preserved, not yet ready for distribution. W. B.-J. C.: 5 adults preserved, distributed as follows: Acad. Nat. Sci. Phila. 1 ♂, 1♀; reserved by Dept. Tropical Res., N. Y. Z. S., 2 ♂♂, 1 ♀, in addition to all young.

Parastagmatoptera vitrepennis Bruner, 1906

Plate V, Figures 18, 19

Local Occurrence.—W. B.-J. C.: Previously recorded only from the ♂ holotype. The second, also a ♂, was taken at Spring Hill Estate, Arima Valley, at an altitude of 1,200 feet, Feb. 25, 1952, by Dr. H. Newcome Wright. A ♀ was brought to us, dried, from the lowlands; presumably taken near St. Augustine.

Color.—♂, in life: Head, prothorax and forelegs buffy green; distal inner surface of 1st coxa jet black; tegmina and wings hyaline; anterior borders of tegmina bright emerald green; 2nd and third legs yellow green; dorsum of abdomen buffy green; venter emerald green. ♀, dried: General color greenish-yellow; distal inner surface of 1st coxa black; stigma on tegmen faintly developed; wing reticulations bright yellow.

Body Length.—♂, dried, 35 mm; ♀, dried, 40 mm.

Disposition of Specimens.—Preserved in collection of Dept. Tropical Res., N. Y. Z. S.

STAGMOMANTIS CAROLINA (Johann., 1763)

Plate VII, Figures 24, 25; Plate VIII, Figure 33

Local Occurrence.—W. B.-J. C.: Uncommon in the Arima Valley. Not taken in 1950. 1951: 1 ♂ (March), 1 ♀ (June). 1952: 11 specimens recorded, including 3 ♂♂ (April and May) and 1 ♀ (Feb.) adults. Adults and young all shaken from bushes, except 1 ♂ which came to night light in May.

S. H.-S.: Widely distributed, especially through lowland agricultural and savannah areas. Of many observed only 6 were collected, all by umbrella method; their records follow: Jan. 16, 1 juv. ♂ from forest edge, Lopinot Road, upper Arauca Valley; Jan. 22, 1 adult ♂, experimental gardens of I.C.T.A. campus, St. Augustine; Jan. 25, 1 adult ♂, from vine overhang at forest edge near Cleaver Road (Arima vicinity); Jan. 27, 1 juv. ♂ at forest edge on Maracas Bay Road; Jan. 28, 1 juv. ♂ from roadside thicket, upper Guanapo Valley; and on Jan. 31, 1 preadult ♂ (of a very dark mottled black color) from deep forest undergrowth, Arena Forest Reserve. The greatest concentration of these mantids, both juveniles of several instars and adults, was observed while sweep netting over the Piarco Savannah in late Jan.; these were not collected.

Breeding.—Oöthecae typical for the species. Eggs laid Mar. 1 hatched April 15; a second group laid April 12 hatched May 13. A 1st instar ♀ captured Feb. 8 was reared to maturity, at laboratory temperatures and with abundant food; there were 8 instars, including the adult, the final molt taking place more than 3 months later, on May 18.

Color in Life.—♂: General color grayish-brown; wings hyaline marked with brown; dorsal side of abdomen dull rose red; a green phase ♂ has not been taken. Detailed color: head, antennae, mouthparts, thorax, entire front leg and other legs except femora and tibiae, Light Drab to Drab, somewhat blotched, on forelegs, with darker. Eyes grayish-olive. Second and third femora and tibiae Pale Turtle Green. Tegmina hyaline, irregularly marked with Buffy Brown, interrupted by the reticulated venation pattern, and with a larger, darker spot a third of the distance from base to tip, near anterior margin. Wings hyaline with a deep border of Buffy Brown, marked by the venation with colorless reticulations. Dorsum of abdomen India Red. Thoracic and abdominal sterna Mouse Gray.

♀: Two specimens (including a reared example) in green phase (1951, 1952), one (1952) in brown. Brown phase: Very similar to male except as follows: Tegmina pale Vinaceous Fawn blotched with brown, darkening posteriorly and on exposed part of abdomen to Fawn Color; the general effect of the entire insect closely resembles lichen. Wings Dragon-blood Red in proximal half to two-thirds, somewhat speckled with yellow, black distally, reticulated with yellow, the whole giving a general impression of a moderately bright red wing. The black stigma on tegmen and a black sternal band between first coxae are not conspicuous in this color phase because of their dark surroundings.

Green phase: Prothorax and articulations of legs brown or purplish-brown; exposed parts otherwise entirely green, ranging from Calliste Green to Absinthe Green, with tegminal specula well marked and conspicuous; as is a strong black bar on prothoracic sternum between first coxae. Wings yellowish-hyaline finely reticulated with Lemon Chrome, deepest proximally, so that the general effect is of bright yellow wings. Dorsum of abdomen Lemon Chrome, where covered by tegmina, with a proximal median streak of brown or dull rose.

First through Fifth Instars: Reared ♀: entirely green; black sternal bar between first femora probably appeared in 5th instar; definitely absent in earlier stages.

Sixth and Seventh Instars: 3 ♀♀: green; black sternal bar well developed; with or without a dark brown or purplish basal median streak on dorsum. Pre-adult ♂, which molted into the brown phase, was green with prothorax, trochanters and tarsi brownish; sternal bar distinct.

Body Length.—♂♂, dried, 54-60 mm; ♀, dried, 60. Reared ♀, approximate length at various instars, not anaesthetized: 1st, 12 mm; 2nd, 17; 3rd, 22; 4th, 29; 5th, 36; 6th, 43; 7th, 50; 8th (adult), 63.

Disposition of Preserved Specimens. — S. H.-S.: 6 specimens preserved, not yet ready for distribution. W. B.-J. C.: 3 ♂♂, 2 ♀♀ plus 1st instar young preserved in collection of Dept. Tropical Res., N. Y. Z. S.

STAGMATOPTERA SEPTENTRIONALIS
Saussure & Zehntner, 1900

Plate VI, Figures 22, 23

Local Occurrence.—W. B.-J. C.: ♂♂ sporadically common, at night lights only, from February to June each year. About 15 taken 1950, and a similar number in 1951. Exactly 25 were taken in 1952. Although 14 of these were banded with a thread around the prothorax and released, none was ever retaken. The 1952 dates, showing

their frequent occurrence in waves over periods of several nights each, are as follows: Feb. 25, 1; Mar. 3-6, 3; April 14-17, 3; April 23-24, 6; May 11, 1; May 14-17, 6; May 22, 1; May 30, 1; June15, 1. Neither ♀♀ nor young were ever seen or taken in the Arima Valley, although 3 ♀♀ were obtained from the lowlands.

Color.—♂, in life: General color Parrot Green. Eyes in daylight bright Green Yellow, dorsal portion of head brown; mouthparts greenish to black, with or without orange or red markings. Femur and tibia of forelegs tinged on inner side with pale Greenish Yellow, with a black spot on middle of inner lower side of femur; major spines of inner series black. Tegmina bordered anteriorly with green, and with a small, variable, dark reddish-brown, oblong stigma near anterior margin, two-fifths of way from base to tip; tegmina otherwise translucent and colorless, as are the wings except for the whitish reticulations. Dorsal surface of abdomen Light Cadmium, with variable median green markings. Usually distinguishable are 3 pairs of crossbars at junctions of 4th-5th, 5th-6th and 6th-7th segments, respectively; anterior, overlapped edges of these segments dark red medially; in addition there are usually some median, longitudinal green markings on other segments, sometimes in form of a single, narrow, green stripe running length of abdomen; these markings vary somewhat even during the lifetime of an individual.

♀, dried: Head, prothorax and legs brownish; tegmina green with strongly developed stigma, consisting of a large white spot surrounded in posterior half by a broad dark crescent. Wings greenish on anterior margin, otherwise hyaline with strong yellow reticulations.

Body Length.—♂♂, dried, 66-74 mm; ♀♀, dried, 81-85.

Remarks.—A ♂ *Stagmatoptera* was placed by error with an old *Oxyopsis* ♀, taken a month previously when already in the adult stage. They scuffled several times, apparently fighting, but later, following an apparent courtship, seemed to copulate completely, holding the position for more than six hours. The next day, both were uninjured, but the female kept moving away from the male, which followed her about, displaying intermittently. On the third day they were found biting and clawing at each other and were separated, both being injured; at the moment she was on top of the male, pinioning his forelegs in her own and was finishing nibbling both his antennae down to the base; he died 2 days later; she survived, producing an oötheca in about two weeks; the eggs did not hatch. The interest in this altogether abnormal encounter under highly artificial conditions lies of course in its suggesting a fairly close relationship between *Oxyopsis* and *Stagmatoptera* (cf. Rehn, 1934, pp. 219, 221, 248 in reference to the relationship between *Stagmomantis* and *Stagmatoptera*).

The suggested relationship is confirmed by the chromosomal characters of the two species; *Oxyopsis rubicunda* (Hughes-Schrader, unpub.) has the same chromosome number and the same compound sex chromosome mechanism as does *Stagmatoptera septentrionalis* (Hughes-Schrader, 1950).

Disposition of Preserved Specimens.—W. B.-J. C.: 14 ♂♂, 3 ♀♀ preserved, distributed as follows: Acad. Nat. Sci. Phila., 3 ♂♂, 1 ♀; U. S. Nat. Mus., 3 ♂♂, 1 ♀; remainder reserved by Dept. Tropical Res., N. Y. Z. S.

Oxyopsis rubicunda (Stol, 1813)

Plate V, Figures 20, 21;
Plate VIII, Figure 32, left

Local Occurrence.—W. B.- J. C.: Rare in the Arima Valley; only four specimens were recorded in 3 seasons; 1 ♀, May, 1950; 2 ♀♀, preadult and adult respectively, March, 1951; 1 ♂, June, 1951. The ♀♀ were all found in plumbago bushes close to the laboratory; the ♂ appeared in the large insectary and lived there a month, usually staying on the screen at a height of about 6 feet, before he was collected; he was doubtless brought in on plants during a nymphal stage.

S. H.-S.: This species was collected at 4 localities. On the trail just below the reservoir, Mt. St. Benedict, 1 juv. ♂ on Jan. 5, and 1 adult ♀ on Jan. 6, both by sweeping low vegetation at trailside. On Jan. 19 an immature ♀ was taken by umbrella beating of shrubs on valley floor just north of Mt. St. Benedict. 1 adult and 1 juv. ♂ were secured from River Estate, Diego Martin Valley, by umbrella beating at edges of clearing near forest, on Jan. 21. From a similar habitat along forest edge near Cleaver Road, 2 juv. ♂♂ were collected by umbrella beating on Jan. 26.

Breeding.—Oötheca almost cylindrical (exclusive of usual produced tip), measuring 9 mm long, 12 mm wide, 12 mm thick.

Color in Life.—♂: Pale yellowish-green except as follows: posterior part of eyes and head, prothorax, base of third femur and all tarsi, brown; tegmina and wings colorless hyaline except for greenish tinge on margins; dorsum of abdomen yellow.

♀: Yellow Green to Apple Green in general color. Eyes green, an Etruscan Red band, silver white anteriorly, connecting them across posterior part of head and tingeing postero-dorsal part of eye. Mouthparts also Etruscan Red, with

bases of palps bright orange. Terminal joints of first tarsus and its distal spines translucent Cadmium Orange, the largest spine tipped with black; other tarsi dark; no black spots on forelegs; a pale bar across sternum between 1st coxae. Tegmina with one or two small dark spots, otherwise translucent pale green, with the reticulations whitish; tips of wings green like tegmina; otherwise they are shiny, hyaline, with reticulations pale yellow green. Dorsum of abdomen very shiny white medially, Lemon Yellow laterally, greenish and dull distally, where it projects beyond tegmina.

Pre-adult ♀: entirely Yellow Green to Apple Green, without markings.

Body Length.—♂, dried, 43 mm; ♀♀, dried, 55-59.

Remarks.—See remarks on *Stagmatoptera,* p. 256.

Disposition of Specimens.—S. H.-S.: 7 adults and young, not yet ready for distribution. W. B.-J. C.: 1 ♂, 3 ♀♀ distributed as follows: Acad. Nat. Sci. Phila., 1 ♀; U. S. Nat. Mus., 1 ♀; reserved by Dept. Tropical Res., N. Y. Z. S., 1 ♂, 1 ♀.

Vates lobata Fabricius, 1798

Plate VII, Figures 26, 27

Local Occurrence.—W. B.-J. C.: Only a single specimen taken, an adult ♀, May 1, 1951; shaken into umbrella from low bushes, trailside, Arima Valley.

Color in Life.—Prothorax and tegmina dull green, the stigma black, small but distinct. Eyes mottled in daylight, not clear green. Head, including cephalic spine, appendages and underside of abdomen medium brown, the forelegs banded with darker brown and the foliations on second and third legs similarly colored. Wings hyaline, obfuscated with brown distally.

Body Length.—♀, dried, 53 mm.

Disposition of Specimen.—Preserved in collection of Dept. Tropical Res., N. Y. Z. S.

References

Beebe, W.

1952. Introduction to the Ecology of the Arima Valley, Trinidad, B.W.I. Zoologica, 37 (13): 157-184.

Beier, M.

1934. Mantodea. Fam. Mantidae; Subfam. Hymenopodinae. In Genera Insectorum, No. 196. Brussels.

1937.1 Mantodea. Fam. Mantidae; Subfam. Thespinae. In Genera Insectorum, No. 200. Brussels.

1937.2 Mantodea. Fam. Mantidae; Subfam. Mantinae. In Genera Insectorum, No. 203. Brussels.

Bruner, L.

1906. Report on the Orthoptera of Trinidad, West Indies. Jour. N. Y. Ent. Soc., 14: 135-165.

Crane, J.

1948. Comparative Biology of salticid spiders at Rancho Grande, Venezuela. Part II. Methods of collection, culture, observation and experiment. Zoologica, 33: 139-145.

Giglio-tos, E.

1927. Orthoptera, Mantidae. In Das Tierreich. Vol. 50. 707 pp. Walter de Gruyter & Co. Berlin.

Hathaway, C. R.

1946. Consideracoes sobre a biologia da *Stagmatoptera precaria* (Linné, 1758) (Mantodea: Mantidae: Vatinae). Mem. Inst. Oswaldo Cruz 44 (1): 105-117.

Hughes-Schrader, S.

1950. The chromosomes of mantids (Orthoptera: Manteidae) in relation to taxonomy. Chromosoma, 4: 1-55.

James, H. G.

1944. Colour changes in *Mantis religiosa* L. Canadian Ent. 76 (6): 113-116.

Rehn, J. A. G.

1911. Orthoptera. Fam Mantidae. Subfam. Vatinae. In Genera Insectorum, No. 119. Brussels.

1935. The Orthoptera of Costa Rica, Part I. Mantidae. Proc. Acad. Nat. Sci. Phila., 87: 167-272.

Roeder, K. D.

1936. Raising the Praying Mantis for experimental purposes. Science, 83: 582-583.

EXPLANATION OF THE PLATES

Plate I

(All figures in Plates I and II are *ca.* 2.5 × natural size)

Fig. 1. *Mantoida* sp., ♂. Body length 17 mm.

Fig. 2. *Liturgousa* sp., ♀. Body length 28 mm.

Fig. 3. *Tithrone roseipennis,* ♂. Body length 20 mm.

Fig. 4. *Acontiothespis multicolor,* ♂. Body length 14 mm.

Fig. 5. *Acontiothespis multicolor,* ♀. Body length 20 mm.

Plate II

(All figures in Plates I and II are *ca.* 2.5 × natural size)

Fig. 6. *Promiopteryx granadensis,* ♂. Body length 14 mm.

Fig. 7. *Promiopteryx granadensis,* ♀. Body length 15 mm.

Fig. 8. *Musonia surinama,* ♂. Body length 24 mm.

Fig. 9. *Musonia surinama,* ♀. Body length 30 mm.

Plate III

(All figures in Plates III-VII, incl., are *ca.* 1.1 × natural size)

Fig. 10. *Catamusonia* sp., ♂. Body length 47 mm.

Fig. 11. *Catamusonia* sp., ♀. Body length 54 mm.

Fig. 12. *Thesprotia filum,* ♂. Body length 47 mm.

Fig. 13. *Thesprotia filum,* ♀. Body length 56 mm.

Plate IV

(All figures in Plates III-VII, incl., are *ca.* 1.1 × natural size)

Fig. 14. *Acanthops falcata,* ♂. Body length 31 mm.

Fig. 15. *Acanthops falcata,* ♀. Body length 32 mm.

Fig. 16. *Angela quinquemaculata,* ♂. Body length 83 mm.

Fig. 17. *Angela* sp., ♀. Body length 100 mm.

Plate V

(All figures in Plates III-VII, incl., are *ca.* 1.1 × natural size)

Fig. 18. *Parastagmatoptera vitrepennis,* ♂. Body length 35 mm.

Fig. 19. *Parastagmatoptera vitrepennis,* ♀. Body length 40 mm.

Fig. 20. *Oxyopsis rubicunda,* ♂. Body length 43 mm.

Fig. 21. *Oxyopsis rubicunda,* ♀. Body length 59 mm.

Plate VI

(All figures in Plates III-VII, incl., are *ca.* 1.1 × natural size)

Fig. 22. *Stagmatoptera septentrionalis,* ♂. Body length 74 mm.

Fig. 23. *Stagmatoptera septentrionalis,* ♀. Body length 81 mm.

Plate VII

(All figures in Plates III-VII, incl., are *ca.* 1.1 × natural size)

Fig. 24. *Stagmomantis carolina,* ♂. Body length 60 mm.

Fig. 25. *Stagmomantis carolina,* ♀. Body length 60 mm.

Fig. 26. *Vates lobata,* ♂. Body length 51 mm. (Individual from Kartabo, Bartica Dist., British Guiana).

Fig. 27. *Vates lobata,* ♀. Body length 53 mm.

Plate VIII

(Figures in this Plate bear no relation in size to one another)

Fig. 28. *Promiopteryx granadensis,* oötheca. Length, excluding filament, 4.4 mm.

Fig. 29. *Thesprotia filum,* oötheca. Length, excluding filament, 7 mm. (Covering bark removed).

Fig. 30. *Musonia surinama,* oötheca. Length, excluding filament, 4.5 mm.

Fig. 31. *Acanthops falcata,* oötheca. Length, excluding both filaments, 5.0 mm.

Fig. 32. Oöthecae. Left, *Oxyopsis rubicunda,* length, excluding filament, 9 mm; middle, *Tithrone roseipennis,* length, excluding filament, 11 mm; right, *Acontiothespis multicolor,* length, excluding filament, 8 mm. (All glued to twig in natural positions). See also Text-fig. 2.

Fig. 33. *Stagmomantis carolina,* oötheca. Length, excluding filament, 28 mm.